

ditional information regarding cold weather. The second storm moved across the Rocky Mountains on the 7th, and over the central valleys on the 8th. This storm caused more extensive precipitation than the preceding one. Heavy snow warnings were issued in advance of the movement of the storm, and were completely verified.

The Bureau received warm commendation from all sides for the excellent work done in connection with these two large snowstorms.

The movement of cold waves in the district during the month was generally gradual, but when sudden changes occurred warnings were given well in advance. The temperature forecasts were carefully followed by shippers of perishable goods and transportation companies and were of much value. Long range forecasts for continued cold weather were made frequently with much success.—*H. J. Cox, Professor.*

Under date of February 21, in its editorial columns, the Chicago Chronicle said:

Our compliments to the gentleman in the tower of the Auditorium Hotel upon the accuracy of his prognostications during the last three weeks or so. No better example of the science of weather forecasting could be desired. Every prediction has been entitled to be marked "verified," even to the very difficult feat of foretelling the temperature during the night. We doubt if the month's record of the local forecaster has been equaled anywhere since the establishment of the Weather Bureau. It certainly has not been excelled, because no higher excellence is possible than the fulfillment of all predictions.

#### SAN FRANCISCO FORECAST DISTRICT.

Killing frosts occurred generally in southern California on the morning of the 2d and were accurately forecast. A succession of low areas passed rapidly southward on the Pacific coast during the first week in February. These were accompanied by general and heavy rains. Advisory messages were sent to Los Angeles and San Diego on the morning of the 5th, of high southerly winds. These were verified. On Sunday, February 10, special frost warnings were issued for southern California and Arizona. Heavy to killing frosts occurred in southern California on the morning of the 11th. Heavy rains occurred over northern California. Combined with warm weather, these gave the forecast official reason to believe that a marked rise in the rivers would occur in a few days. Special warnings were sent to Colusa. On the morning of the 20th special river reports were called for from all points along the Sacramento River. Reports of the condition of the rivers were published and warnings of high water in the Basin were distributed generally through the press. The Sacramento River continued to rise, reaching a crest of 28.2 feet on February 25. The crest of the flood was accurately forecast.—*A. G. McAdie, Forecast Official.*

#### PORTLAND, OREG., FORECAST DISTRICT.

No severe storms or other unusual weather conditions occurred in this district during the month.

Brisk and high winds of short duration occurred along the Washington coasts on several occasions, all of which were successfully forecast.

Heavy rains from the 13th to the 16th caused a slight rise in the Willamette River and tributaries, and forecasts covering the expected rise were issued from the 14th to the 20th.—*A. B. Wollaber, Acting Forecast Official.*

#### AREAS OF HIGH AND LOW PRESSURE.

*Movements of centers of areas of high and low pressure.*

Number.	First observed.			Last observed.			Path.		Average velocities.	
	Date.	Lat. N.	Long. W.	Date.	Lat. N.	Long. W.	Length.	Duration.	Daily.	Hourly.
<b>High areas.</b>										
I.....	2, a. m.	39	83	3, a. m.	43	74	525	1.0	585	21.9
II.....	2, p. m.	53	108	7, a. m.	39	82	1,950	4.0†	488	20.3
III.....	7, a. m.	53	122	8, p. m.	50	97	1,075	1.5	717	29.9
IV.....	8, a. m.	41	105	11, a. m.	38	78	1,530	2.3‡	620	25.8
V.....	9, p. m.	54	114	14, a. m.	48	85	1,375	3.0§	458	19.1
VI.....	14, a. m.	48	125	15, p. m.	50	99	1,200	1.5	800	38.3
VII.....	17, a. m.	58	121	22, a. m.	21	71	3,775	4.0†	944	39.4
VIII.....	22, p. m.	35	102	25, p. m.	32	81	2,400	3.0	800	38.3
IX.....	27, a. m.	42	98	1, a. m.*	32	64	1,750	2.0	875	36.5
Sums.....							15,600	22.5	6,227	259.5
Mean of 9 paths.....							1,733		692	28.8
Mean of 22.5 days.....									693	28.9
<b>Low areas.</b>										
I.....	1, a. m.	33	115	9, a. m.	48	54	3,900	7.0†	557	28.2
II.....	2, a. m.	47	128	11, a. m.	48	54	4,600	9.0	511	21.3
III.....	7, a. m.	26	97	9, p. m.	32	65	2,100	1.5†	1,400	58.3
IV.....	7, p. m.	40	122	10, p. m.	33	115	850	2.3‡	340	14.2
V.....	9, a. m.	53	114	11, a. m.	47	88	1,300	2.0	600	27.0
VI.....	13, a. m.	40	123	16, p. m.	40	75	2,800	3.5	800	38.3
VII.....	15, a. m.	49	123	18, a. m.	48	89	1,875	3.0	625	26.0
VIII.....	18, a. m.	38	97	18, a. m.	41	74	2,325	3.0	942	39.2
IX.....	18, p. m.	41	124	20, a. m.	39	65	1,900	2.0	950	39.6
X.....	21, a. m.	40	105	25, a. m.	48	54	4,000	4.0	1,000	41.7
XI.....	21, p. m.	40	109	22, p. m.	32	107	575	1.0	575	24.0
XII.....	24, a. m.	48	85	28, a. m.	48	54	1,650	3.0†	550	22.9
XIII.....	23, p. m.	34	112	26, a. m.	28	82	2,000	1.5†	1,333	55.6
XIV.....	27, p. m.	38	100	2, p. m.*	32	65	2,450	3.0	817	34.0
Sums.....							33,325	47.5	11,400	475.0
Mean of 15 paths.....							2,222		760	31.7
Mean of 47.5 days.....									702	29.2

\* March. † Stationary for 1 day. ‡ Stationary for 1 day. § Stationary for 2 days.

#### RIVERS AND FLOODS.

River matters were dull and almost entirely uneventful during the month. Stages, as a rule, were somewhat lower than during January, 1901. A few minor flood warnings were issued in the southern districts from the 4th to the 9th. Nothing serious was anticipated and no damage of consequence occurred. The rivers of the Pacific coast system were also comparatively high during the third week of the month, owing to heavy rains, and stages close to the danger lines were reached. Cautionary advices regarding these rises were issued by the officials in charge of the Weather Bureau offices at San Francisco and Portland.

Ice conditions remained practically unchanged, except in the upper Mississippi River, where the line of total freezing moved southward to below Davenport, Iowa. The Ohio River at Wheeling, W. Va., closed on the 24th, and at the end of the month a gorge still held near the lower portion of the city, although the river was clear above. There was much floating ice along the entire river during the greater portion of the month, but very little in the Mississippi River below the mouth of the Ohio.

The highest and lowest water, mean stage, and monthly range at 132 river stations are given in table VII. Hydrographs for typical points on seven principal rivers are shown on Chart V. The stations selected for charting are: Keokuk, St. Louis, Memphis, Vicksburg, and New Orleans, on the Mississippi; Cincinnati and Cairo, on the Ohio; Nashville, on the Cumberland; Johnsonville on the Tennessee; Kansas City, on the Missouri; Little Rock, on the Arkansas; and Shreveport, on the Red.—*H. C. Frankenfield, Forecast Official.*